

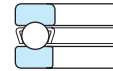
Thrust ball bearings

Thrust ball bearings are divided into single and double direction types. The former is able to accommodate axial load in one direction, while the latter is able to accommodate it in both directions.

Neither is suitable for applications that involve radial load or high-speed rotation.

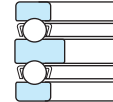
Bearings whose housing race back face is spherical (with a spherical back face or aligning seat race) are designed with a self-aligning capability and can accommodate the effects of inaccurate mounting.

Single direction thrust ball bearings



Bore diameter **10 – 360 mm**

Double direction thrust ball bearings



Bore diameter **10 – 190 mm**



Boundary dimensions	As specified in JIS B 1512.
Tolerances	As specified in JIS B 1514-2. (refer to Table 7-9 on p. A 74.)
Recommended fits	Refer to Table 9-8 on p. A 98.
Standard cages	• Pressed cage (supplementary code : //) • Copper alloy or carbon steel machined cage (supplementary code : FY or FC) • Polyamide resin molded cage (supplementary code : MG)

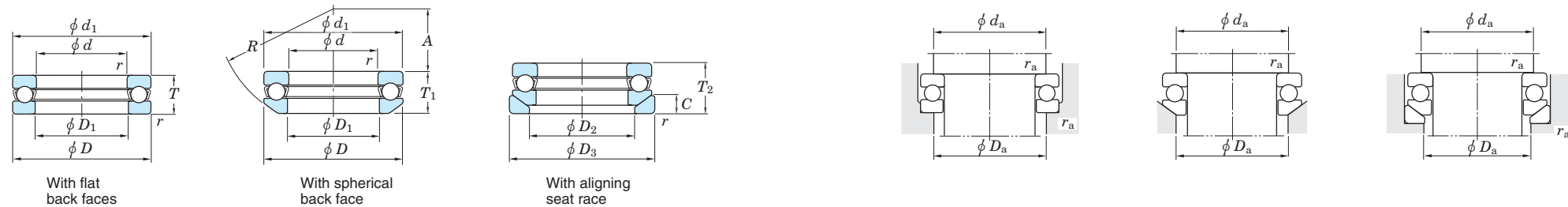
Application of standard cages

Bearing series	Molded cage	Pressed cage	Machined cage
511	51100 – 51107	51108 – 51132	51134 – 51172
512	51200 – 51207	51208 – 51224	51226 – 51272
532	53200 – 53207	53208 – 53224	53226 – 53272
532 U	53200U – 53207U	53208U – 53224U	53226U – 53272U
513	–	51305 – 51313	51314 – 51340
533	–	53305 – 53313	53314 – 53340
533 U	–	53305U – 53313U	53314U – 53340U
514	–	51405 – 51416	51417 – 51436
534	–	53405 – 53416	53417 – 53420
534 U	–	53405U – 53416U	53417U – 53420U
522	–	52202 – 52224	52226 – 52244
542	–	54202 – 54224	54226 – 54244
542 U	–	54205U – 54224U	54226U – 54244U
523	–	52305 – 52313	52314 – 52340
543	–	54305 – 54313	54314 – 54324
543 U	–	54305U – 54313U	54314U – 54324U
524	–	52405 – 52411	52412 – 52444
544	–	54405 – 54411	54412 – 54420
544 U	–	54405U – 54411U	54412U – 54420U

Required minimum axial load	A certain degree of load is necessary in order for bearings to operate satisfactorily. (refer to p. A 116.)
Allowable misalignment	Misalignment not allowed. (for flat back face type.)
Equivalent axial load	Dynamic equivalent axial load $P_a = F_a$ Static equivalent axial load $P_{0a} = F_a$

Single direction thrust ball bearings

d 10 ~ (40) mm

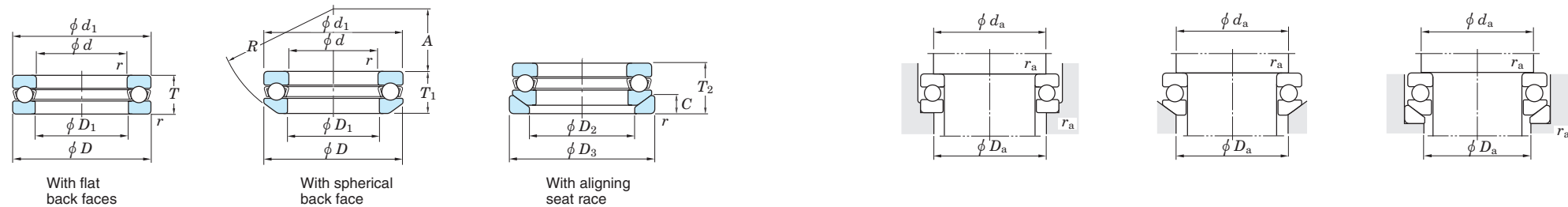


Boundary dimensions (mm)						Basic load ratings (kN)		Fatigue load limit	Limiting speeds (min ⁻¹)		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T ₁	T ₂	r min.	C _a	C _{0a}	C _u	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d ₁ max.	D ₁ min.	D ₂	D ₃	A	R	C	d _a min.	D _a max.	r _a max.	With flat back faces	With spherical back face	With aligning seat race
10	24	9	—	—	0.3	12.5	14.0	0.630	6 500	10 000	51100	—	—	24	11	—	—	—	—	—	18	16	0.3	0.020	—	—
	26	11	11.6	13	0.6	15.8	17.1	0.770	5 700	8 800	51200	53200	53200U	26	12	18	28	8.5	22	3.5	20	16	0.6	0.030	0.029	0.037
12	26	9	—	—	0.3	12.9	14.0	0.690	6 500	10 000	51101	—	—	26	13	—	—	—	—	—	20	18	0.3	0.022	—	—
	28	11	11.4	13	0.6	16.5	19.0	0.860	5 400	8 300	51201	53201	53201U	28	14	20	30	11.5	25	3.5	22	18	0.6	0.034	0.031	0.043
15	28	9	—	—	0.3	13.2	15.4	0.760	6 100	9 400	51102	—	—	28	16	—	—	—	—	—	23	20	0.3	0.024	—	—
	32	12	13.3	15	0.6	20.8	24.8	1.10	4 900	7 500	51202	53202	53202U	32	17	24	35	12	28	4	25	22	0.6	0.046	0.048	0.062
17	30	9	—	—	0.3	13.5	18.2	0.820	6 100	9 400	51103	—	—	30	18	—	—	—	—	—	25	22	0.3	0.028	—	—
	35	12	13.2	15	0.6	21.5	27.3	1.25	4 900	7 500	51203	53203	53203U	35	19	26	38	16	32	4	28	24	0.6	0.053	0.055	0.070
20	35	10	—	—	0.3	17.8	24.7	1.10	5 100	7 900	51104	—	—	35	21	—	—	—	—	—	29	26	0.3	0.040	—	—
	40	14	14.7	17	0.6	27.9	37.7	1.70	3 900	6 000	51204	53204	53204U	40	22	30	42	18	36	5	32	28	0.6	0.082	0.080	0.100
25	42	11	—	—	0.6	24.4	37.2	1.70	4 400	6 800	51105	—	—	42	26	—	—	—	—	—	35	32	0.6	0.059	—	—
	47	15	16.7	19	0.6	34.6	50.4	2.30	3 600	5 500	51205	53205	53205U	47	27	36	50	19	40	5.5	38	34	0.6	0.120	0.120	0.152
	52	18	19.8	22	1	44.7	61.4	2.75	3 100	4 800	51305	53305	53305U	52	27	38	55	21	45	6	41	36	1	0.180	0.180	0.224
	60	24	26.4	29	1	69.5	89.4	4.05	2 600	4 000	51405	53405	53405U	60	27	42	62	19	50	8	46	39	1	0.340	0.350	0.442
30	47	11	—	—	0.6	25.5	42.2	1.90	4 300	6 600	51106	—	—	47	32	—	—	—	—	—	40	37	0.6	0.068	—	—
	52	16	17.8	20	0.6	36.7	58.2	2.65	3 400	5 200	51206	53206	53206U	52	32	42	55	22	45	5.5	43	39	0.6	0.150	0.160	0.193
	60	21	22.6	25	1	53.5	78.7	3.55	2 700	4 200	51306	53306	53306U	60	32	45	62	22	50	7	48	42	1	0.270	0.270	0.326
	70	28	30.1	33	1	91.0	126	5.70	2 200	3 400	51406	53406	53406U	70	32	50	75	20	56	9	54	46	1	0.530	0.530	0.660
35	52	12	—	—	0.6	25.5	47.2	2.00	3 900	6 000	51107	—	—	52	37	—	—	—	—	—	45	42	0.6	0.090	—	—
	62	18	19.9	22	1	48.9	78.2	3.55	2 900	4 500	51207	53207	53207U	62	37	48	65	24	50	7	51	46	1	0.220	0.220	0.277
	68	24	25.6	28	1	69.3	105	4.75	2 400	3 700	51307	53307	53307U	68	37	52	72	24	56	7.5	55	48	1	0.390	0.400	0.484
	80	32	34	37	1.1	109	155	7.00	1 900	2 900	51407	53407	53407U	80	37	58	85	23	64	10	62	53	1	0.790	0.790	0.960
40	60	13	—	—	0.6	33.6	62.8	2.85	3 400	5 300	51108	—	—	60	42	—	—	—	—	—	52	48	0.6	0.120	—	—
	68	19	20.3	23	1	58.7	98.3	4.45	2 700	4 200	51208	53208	53208U	68	42	55	72	28.5	56	7	57	51	1	0.270	0.270	0.340
	78	26	28.5	31	1	86.6	135	6.05	2 100	3 300	51308	53308	53308U	78	42	60	82	28	64	8.5	63	55	1	0.550	0.570	0.690

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single direction thrust ball bearings

d (40) ~ 70 mm

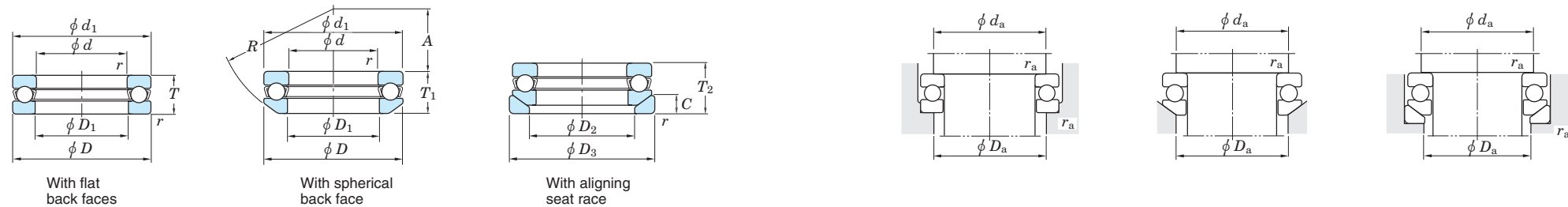


Boundary dimensions (mm)						Basic load ratings (kN)		Fatigue load limit	Limiting speeds (min ⁻¹)		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T ₁	T ₂	r min.	C _a	C _{0a}	C _u	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d ₁ max.	D ₁ min.	D ₂	D ₃	A	R	C	d _a min.	D _a max.	r _a max.	With flat back faces	With spherical back face	With aligning seat race
40	90	36	38.2	42	1.1	141	205	9.25	1 700	2 600	51408	53408	53408U	90	42	65	95	26	72	12	70	60	1	1.14	1.12	1.37
	65	14	—	—	0.6	34.8	69.1	3.10	3 200	5 000	51109	—	—	65	47	—	—	—	—	—	57	53	0.6	0.150	—	—
	73	20	21.3	24	1	59.7	105	4.75	2 600	4 000	51209	53209	53209U	73	47	60	78	26	56	7.5	62	56	1	0.320	0.310	0.397
	85	28	30.1	33	1	100	163	7.40	1 900	3 000	51309	53309	53309U	85	47	65	90	25	64	10	69	61	1	0.690	0.680	0.850
50	100	39	42.4	46	1.1	162	242	10.9	1 500	2 300	51409	53409	53409U	100	47	72	105	29	80	12.5	78	67	1	1.47	1.50	1.82
	70	14	—	—	0.6	35.9	75.4	3.40	3 100	4 800	51110	—	—	70	52	—	—	—	—	—	62	58	0.6	0.160	—	—
	78	22	23.5	26	1	60.6	111	5.05	2 300	3 600	51210	53210	53210U	78	52	62	82	32.5	64	7.5	67	61	1	0.390	0.380	0.480
	95	31	34.3	37	1.1	121	202	9.10	1 800	2 700	51310	53310	53310U	95	52	72	100	28	72	11	77	68	1	1.00	1.01	1.24
55	110	43	45.6	50	1.5	185	283	12.8	1 400	2 100	51410	53410	53410U	110	52	80	115	35	90	14	86	74	1.5	1.99	1.97	2.38
	78	16	—	—	0.6	43.5	93.1	4.20	2 800	4 300	51111	—	—	78	57	—	—	—	—	—	69	64	0.6	0.240	—	—
	90	25	27.3	30	1	86.7	159	7.20	2 100	3 200	51211	53211	53211U	90	57	72	95	35	72	9	76	69	1	0.610	0.620	0.770
	105	35	39.3	42	1.1	149	246	11.1	1 600	2 400	51311	53311	53311U	105	57	80	110	30	80	11.5	85	75	1	1.34	1.41	1.69
60	120	48	50.5	55	1.5	223	359	16.2	1 200	1 900	51411	53411	53411U	120	57	88	125	28	90	15.5	94	81	1.5	2.64	2.57	3.10
	85	17	—	—	1	51.8	113	5.10	2 600	4 000	51112	—	—	85	62	—	—	—	—	—	75	70	1	0.290	—	—
	95	26	28	31	1	92.0	179	8.05	1 900	3 000	51212	53212	53212U	95	62	78	100	32.5	72	9	81	74	1	0.690	0.690	0.850
	110	35	38.3	42	1.1	154	267	12.1	1 500	2 300	51312	53312	53312U	110	62	85	115	41	90	11.5	90	80	1	1.43	1.47	1.78
65	130	51	54	58	1.5	267	437	19.7	1 100	1 700	51412	53412	53412U	130	62	95	135	34	100	16	102	88	1.5	3.51	3.44	4.13
	90	18	—	—	1	52.1	117	5.30	2 400	3 700	51113	—	—	90	67	—	—	—	—	—	80	75	1	0.340	—	—
	100	27	28.7	32	1	93.6	189	8.50	1 900	2 900	51213	53213	53213U	100	67	82	105	40	80	9	86	79	1	0.770	0.750	0.930
	115	36	39.4	43	1.1	159	287	13.0	1 400	2 200	51313	53313	53313U	115	67	90	120	38.5	90	12.5	95	85	1	1.57	1.61	1.95
70	140	56	60.2	65	2	290	493	22.0	1 000	1 600	51413	53413	53413U	140	68	100	145	40	112	17.5	110	95	2	4.47	4.47	5.28
	95	18	—	—	1	53.8	127	5.70	2 300	3 600	51114	—	—	95	72	—	—	—	—	—	85	80	1	0.360	—	—
	105	27	28.8	32	1	95.2	199	8.95	1 800	2 800	51214	53214	53214U	105	72	88	110	38	80	9	91	84	1	0.810	0.800	0.990
	125	40	44.2	48	1.1	167	291	13.1	1 300	2 000	51314	53314	53314U	125	72	98	130	43	100	13	103	92	1	2.06	2.15	2.56
70	150	60	63.6	69	2	312	553	23.8	940	1 450	51414	53414	53414U	150	73	110	155	34	112	19.5	118	102	2	5.48	5.38	6.37

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single direction thrust ball bearings

d 75 ~ (120) mm

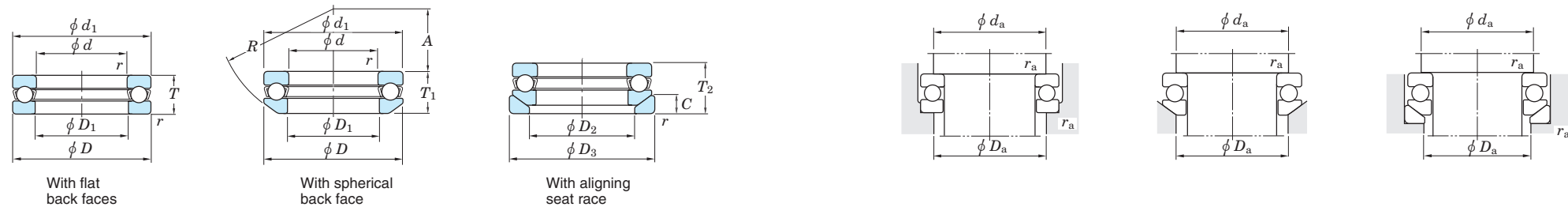


Boundary dimensions (mm)						Basic load ratings (kN)		Fatigue load limit	Limiting speeds (min ⁻¹)		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T ₁	T ₂	r min.	C _a	C _{0a}	(kN) C _u	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d ₁ max.	D ₁ min.	D ₂	D ₃	A	R	C	d _a min.	D _a max.	r _a max.	With flat back faces	With spherical back face	With aligning seat race
75	100	19	—	—	1	55.5	136	6.15	2 200	3 400	51115	—	—	100	77	—	—	—	—	—	90	85	1	0.420	—	—
	110	27	28.3	32	1	96.7	209	9.40	1 800	2 700	51215	53215	53215U	110	77	92	115	49	90	9.5	96	89	1	0.860	0.850	1.06
	135	44	48.1	52	1.5	192	339	15.0	1 200	1 900	51315	53315	53315U	135	77	105	140	37	100	15	111	99	1.5	2.68	2.72	3.27
	160	65	69	75	2	315	560	23.3	880	1 350	51415	53415	53415U	160	78	115	165	42	125	21	125	110	2	6.75	6.64	7.87
80	105	19	—	—	1	55.8	141	6.35	2 100	3 300	51116	—	—	105	82	—	—	—	—	—	95	90	1	0.430	—	—
	115	28	29.5	33	1	98.1	218	9.85	1 700	2 600	51216	53216	53216U	115	82	98	120	46	90	10	101	94	1	0.950	0.930	1.15
	140	44	47.6	52	1.5	200	368	15.8	1 200	1 800	51316	53316	53316U	140	82	110	145	50	112	15	116	104	1.5	2.82	2.86	3.43
	170	68	72.2	78	2.1	337	621	25.1	810	1 250	51416	53416	53416U	170	83	125	175	36	125	22	133	117	2	7.97	7.84	9.22
85	110	19	—	—	1	57.4	150	6.80	2 100	3 200	51117	—	—	110	87	—	—	—	—	—	100	95	1	0.460	—	—
	125	31	33.1	37	1	119	264	11.6	1 500	2 300	51217	53217	53217U	125	88	105	130	52	100	11	109	101	1	1.29	1.28	1.57
	150	49	53.1	58	1.5	232	419	17.5	1 100	1 700	51317	53317	53317U	150	88	115	155	43	112	17.5	124	111	1.5	3.66	3.63	4.44
	180	72	77	83	2.1	384	753	29.5	780	1 200	51417	53417	53417U	177	88	130	185	47	140	23	141	124	2	9.29	9.20	10.8
90	120	22	—	—	1	74.6	190	8.40	1 900	2 900	51118	—	—	120	92	—	—	—	—	—	108	102	1	0.680	—	—
	135	35	38.5	42	1.1	146	326	13.9	1 400	2 100	51218	53218	53218U	135	93	110	140	45	100	13.5	117	108	1	1.77	1.77	2.19
	155	50	54.6	59	1.5	242	454	18.5	1 000	1 600	51318	53318	53318U	155	93	120	160	40	112	18	129	116	1.5	3.88	3.87	4.71
	190	77	81.2	88	2.1	409	826	31.5	710	1 100	51418	53418	53418U	187	93	140	195	40	140	25.5	149	131	2	11.0	10.7	12.6
100	135	25	—	—	1	106	268	11.2	1 600	2 500	51120	—	—	135	102	—	—	—	—	—	121	114	1	0.990	—	—
	150	38	40.9	45	1.1	183	410	16.6	1 200	1 900	51220	53220	53220U	150	103	125	155	52	112	14	130	120	1	2.36	2.34	2.84
	170	55	59.2	64	1.5	296	595	23.2	940	1 450	51320	53320	53320U	170	103	135	175	46	125	18	142	128	1.5	5.11	5.10	6.05
	210	85	90	98	3	460	983	35.7	620	950	51420	53420	53420U	205	103	155	220	50	160	27	165	145	2.5	14.6	14.5	17.4
110	145	25	—	—	1	109	288	11.5	1 600	2 400	51122	—	—	145	112	—	—	—	—	—	131	124	1	1.08	—	—
	160	38	40.2	45	1.1	191	450	17.6	1 200	1 800	51222	53222	53222U	160	113	135	165	65	125	14	140	130	1	2.57	2.50	3.06
	190	63	67.2	72	2	334	704	25.9	810	1 250	51322	53322	53322U	187	113	150	195	51	140	20.5	158	142	2	7.72	7.63	8.90
	230	95	—	—	3	474	1 070	37.1	550	850	51422	—	—	225	113	—	—	—	—	—	181	159	2.5	19.8	—	—
120	155	25	—	—	1	111	305	11.9	1 500	2 300	51124	—	—	155	122	—	—	—	—	—	141	134	1	1.16	—	—

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single direction thrust ball bearings

d (120) ~ (180) mm

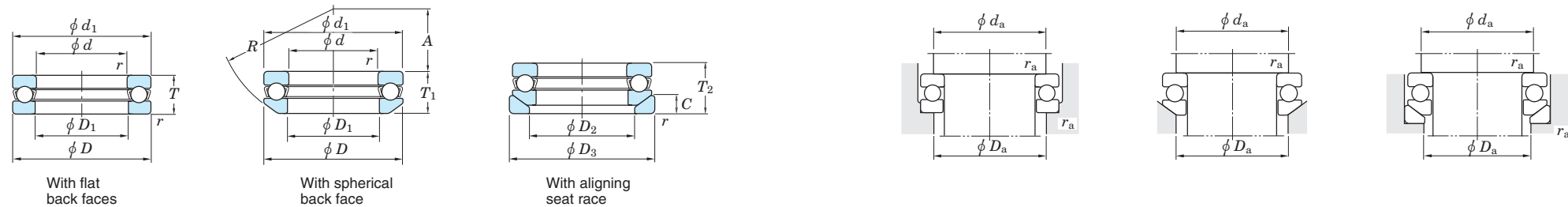


Boundary dimensions (mm)						Basic load ratings (kN)		Fatigue load limit	Limiting speeds (min ⁻¹)		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T ₁	T ₂	r min.	C _a	C _{0a}	C _u	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d ₁ max.	D ₁ min.	D ₂	D ₃	A	R	C	d _a min.	D _a max.	r _a max.	With flat back faces	With spherical back face	With aligning seat race
120	170	39	40.8	46	1.1	192	470	17.7	1 100	1 700	51224	53224	53224U	170	123	145	175	61	125	15	150	140	1	2.86	2.81	3.46
	210	70	74.1	80	2.1	389	869	30.5	710	1 100	51324	53324	53324U	205	123	165	220	63	160	22	173	157	2	10.6	10.4	12.4
	250	102	—	—	4	601	1 460	48.5	520	800	51424	—	—	245	123	—	—	—	—	—	196	174	3	25.0	—	—
130	170	30	—	—	1	130	350	13.0	1 300	2 000	51126	—	—	170	132	—	—	—	—	—	154	146	1	1.87	—	—
	190	45	47.9	53	1.5	254	620	22.2	970	1 500	51226	53226	53226U	187	133	160	195	67	140	17	166	154	1.5	4.09	3.98	4.88
	225	75	80.3	86	2.1	413	958	32.5	650	1 000	51326	53326	53326U	220	134	177	235	53	160	26	186	169	2	13.0	12.7	15.2
	270	110	—	—	4	623	1 540	49.0	490	750	51426	—	—	265	134	—	—	—	—	—	212	188	3	31.4	—	—
140	180	31	—	—	1	133	375	13.5	1 200	1 900	51128	—	—	178	142	—	—	—	—	—	164	156	1	2.02	—	—
	200	46	48.6	55	1.5	234	650	19.6	940	1 450	51228	53228	53228U	197	143	170	210	87	160	17	176	164	1.5	4.46	4.35	5.89
	240	80	84.9	92	2.1	458	1 130	36.9	620	950	51328	53328	53328U	235	144	190	250	68	180	26	199	181	2	15.5	15.1	18.0
	280	112	—	—	4	650	1 680	52.2	450	700	51428	—	—	275	144	—	—	—	—	—	222	198	3	33.9	—	—
150	190	31	—	—	1	137	400	13.9	1 200	1 900	51130	—	—	188	152	—	—	—	—	—	174	166	1	2.15	—	—
	215	50	53.3	60	1.5	266	652	21.8	840	1 300	51230	53230	53230U	212	153	180	225	79	160	20.5	189	176	1.5	5.64	5.45	7.14
	250	80	83.7	92	2.1	451	1 130	36.0	580	900	51330	53330	53330U	245	154	200	260	89.5	200	26	209	191	2	16.3	15.7	18.8
	300	120	—	—	4	711	1 910	57.4	420	650	51430	—	—	295	154	—	—	—	—	—	238	212	3	41.6	—	—
160	200	31	—	—	1	140	425	14.4	1 200	1 800	51132	—	—	198	162	—	—	—	—	—	184	176	1	2.28	—	—
	225	51	54.7	61	1.5	279	718	23.4	810	1 250	51232	53232	53232U	222	163	190	235	74	160	21	199	186	1.5	6.53	6.09	7.90
	270	87	91.7	100	3	512	1 340	41.3	550	850	51332	53332	53332U	265	164	215	280	77	200	29	225	205	2.5	21.0	21.0	23.4
	320	130	—	—	5	852	2 410	70.3	390	600	51432	—	—	315	164	—	—	—	—	—	254	226	4	51.2	—	—
170	215	34	—	—	1.1	168	510	16.7	1 100	1 700	51134	—	—	213	172	—	—	—	—	—	197	188	1	3.25	—	—
	240	55	58.7	65	1.5	326	834	26.3	750	1 150	51234	53234	53234U	237	173	200	250	91	180	21.5	212	198	1.5	8.12	7.69	9.83
	280	87	91.3	100	3	579	1 570	47.4	520	800	51334	53334	53334U	275	174	220	290	105	225	29	235	215	2.5	22.0	22.0	24.5
	340	135	—	—	5	943	2 730	77.2	360	550	51434	—	—	335	174	—	—	—	—	—	270	240	4	60.0	—	—
180	225	34	—	—	1.1	168	525	16.7	1 000	1 600	51136	—	—	222	183	—	—	—	—	—	207	198	1	3.39	—	—
	250	56	58.2	66	1.5	332	874	26.9	710	1 100	51236	53236	53236U	247	183	210	260	112	200	21.5	222	208	1.5	8.68	8.08	10.4
	300	95	99.3	109	3	578	1 580	46.2	490	750	51336	53336	53336U	295	184	240	310	91	225	32	251	229	2.5	28.1	26.9	29.9

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single direction thrust ball bearings

d (180) ~ 360 mm

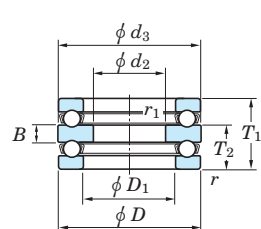


Boundary dimensions (mm)						Basic load ratings (kN)		Fatigue load limit (kN)	Limiting speeds (min ⁻¹)		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T ₁	T ₂	r min.	C _a	C _{0a}	C _u	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d ₁ max.	D ₁ min.	D ₂	D ₃	A	R	C	d _a min.	D _a max.	r _a max.	With flat back faces	With spherical back face	With aligning seat race
180	360	140	—	—	5	928	2 730	75.1	320	500	51436	—	—	355	184	—	—	—	—	—	286	254	4	69.5	—	—
	240	37	—	—	1.1	213	655	20.2	970	1 500	51138	—	—	237	193	—	—	—	—	—	220	210	1	3.95	—	—
	270	62	65.7	73	2	385	1 060	31.4	650	1 000	51238	53238	53238U	267	194	230	280	98	200	23	238	222	2	11.7	11.2	13.9
190	320	105	111	121	4	679	1 950	55.3	440	680	51338	53338	53338U	315	195	255	330	104	250	33	266	244	3	36.0	36.3	39.7
	250	37	—	—	1.1	215	675	20.4	940	1 450	51140	—	—	247	203	—	—	—	—	—	230	220	1	4.13	—	—
	280	62	65.3	74	2	392	1 110	32.2	620	950	51240	53240	53240U	277	204	240	290	125	225	23	248	232	2	12.2	11.6	14.8
200	340	110	118.4	130	4	745	2 220	61.1	420	650	51340	53340	53340U	335	205	270	350	92	250	38	282	258	3	42.9	42.7	46.7
	270	37	—	—	1.1	221	740	21.3	880	1 350	51144	—	—	267	223	—	—	—	—	—	250	240	1	4.50	—	—
	300	63	65.6	75	2	428	1 310	36.6	580	900	51244	53244	53244U	297	224	260	310	118	225	25	268	252	2	13.5	12.6	15.9
220	300	45	—	—	1.5	301	1 020	28.0	750	1 150	51148	—	—	297	243	—	—	—	—	—	276	264	1.5	7.38	—	—
	340	78	81.6	92	2.1	553	1 800	47.8	520	800	51248	53248	53248U	335	244	290	350	122	250	30	299	281	2	23.1	20.9	25.6
	320	45	—	—	1.5	289	990	26.2	710	1 100	51152	—	—	317	263	—	—	—	—	—	296	284	1.5	7.93	—	—
240	360	79	82.8	93	2.1	556	1 880	48.1	490	750	51252	53252	53252U	355	264	305	370	152	280	30	319	301	2	25.0	22.6	28.5
	350	53	—	—	1.5	411	1 430	36.4	640	900	51156	—	—	347	283	—	—	—	—	—	322	308	1.5	12.0	—	—
	380	62	—	—	2	454	1 610	39.4	540	810	51160	—	—	376	304	—	—	—	—	—	348	332	2	17.5	—	—
260	420	95	100.5	112	3	713	2 600	61.9	400	600	51260	53260	53260U	415	304	360	430	164	320	34	371	349	2.5	42.5	39.5	48.0
	400	63	—	—	2	474	1 760	41.9	540	810	51164	—	—	396	324	—	—	—	—	—	368	352	2	19.0	—	—
	440	95	100.5	112	3	721	2 710	62.9	400	600	51264	53264	53264U	435	325	380	450	157	320	36	391	369	2.5	45.0	42.0	52.0
320	420	64	—	—	2	483	1 860	43.1	500	770	51168	—	—	416	344	—	—	—	—	—	388	372	2	20.5	—	—
	460	96	100.3	113	3	730	2 830	63.8	380	570	51268	53268	53268U	455	345	400	470	199	360	36	411	389	2.5	48.0	45.0	55.0
	440	65	—	—	2	493	1 960	44.3	500	720	51172	—	—	436	364	—	—	—	—	—	408	392	2	21.5	—	—
340	500	110	116.7	130	4	876	3 500	76.1	340	500	51272	53272	53272U	495	365	430	510	172	360	43	443	417	3	70.0	65.0	82.0

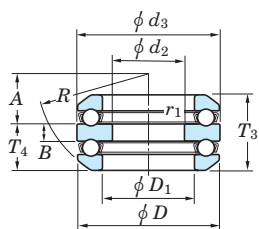
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Double direction thrust ball bearings

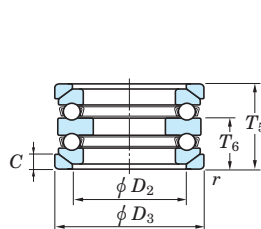
d_2 10 ~ (50) mm



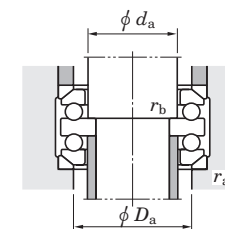
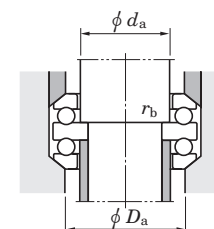
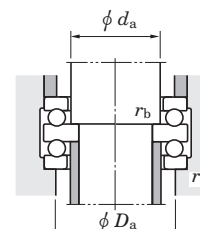
With flat back faces



With spherical back faces



With aligning seat races



Boundary dimensions (mm)							Basic load ratings (kN)		Fatigue load limit (kN) C _u	Limiting speeds (min ⁻¹) Grease lub. Oil lub.		Bearing No.				Dimensions (mm)											Mounting dimensions (mm)				(Refer.) Mass (kg)	
d ₂	D	T ₁	T ₃	T ₅	r min.	r ₁ min.	C _a	C _{0a}		With flat back faces	With spherical back faces	With aligning seat races	d ₃ max.	D ₁ min.	D ₂	D ₃	T ₂	T ₄	T ₆	A	R	B	C	d _a min.	D _a max.	r _a max.	r _b max.	With flat back faces	With align seat races			
10	32	22	24.6	28	0.6	0.3	20.8	24.8	1.10	4 900	7 500	52202	54202	54202U		32	17	24	35	13.5	14.8	16.5	10.5	28	5	4	15	24	0.6	0.3	0.085	0.118
15	40	26	27.4	32	0.6	0.3	27.9	37.7	1.70	3 900	6 000	52204	54204	54204U		40	22	30	42	16	16.7	19	16	36	6	5	20	30	0.6	0.3	0.150	0.190
	60	45	49.8	55	1	0.6	69.5	89.4	4.05	2 600	4 000	52405	54405	54405U		60	27	42	62	28	30.4	33	15	50	11	8	25	42	1	0.6	0.630	0.804
20	47	28	31.4	36	0.6	0.3	34.6	50.4	2.30	3 600	5 500	52205	54205	54205U		47	27	36	50	17.5	19.2	21.5	16.5	40	7	5.5	25	36	0.6	0.3	0.230	0.304
	52	34	37.6	42	1	0.3	44.7	61.4	2.75	3 100	4 800	52305	54305	54305U		52	27	38	55	21	22.8	25	18	45	8	6	25	38	1	0.3	0.330	0.428
	70	52	56.2	62	1	0.6	91.0	126	5.70	2 200	3 400	52406	54406	54406U		70	32	50	75	32	34.1	37	16	56	12	9	30	50	1	0.6	1.00	1.25
25	52	29	32.6	37	0.6	0.3	36.7	54.3	2.65	3 400	5 200	52206	54206	54206U		52	32	42	55	18	19.8	22	20	45	7	5.5	30	42	0.6	0.3	0.270	0.346
	60	38	41.2	46	1	0.3	53.5	78.7	3.55	2 700	4 200	52306	54306	54306U		60	32	45	62	23.5	25.1	27.5	19.5	50	9	7	30	45	1	0.3	0.490	0.602
	80	59	63	69	1.1	0.6	109	155	7.00	1 900	2 900	52407	54407	54407U		80	37	58	85	36.5	38.5	41.5	18.5	64	14	10	35	58	1	0.6	1.44	1.79
30	62	34	37.8	42	1	0.3	48.9	83.8	3.55	2 900	4 500	52207	54207	54207U		62	37	48	65	21	22.9	25	21	50	8	7	35	48	1	0.3	0.420	0.544
	68	36	38.6	44	1	0.6	58.7	98.3	4.45	2 700	4 200	52208	54208	54208U		68	42	55	72	22.5	23.8	26.5	25	56	9	7	40	55	1	0.6	0.540	0.680
	68	44	47.2	52	1	0.3	69.3	105	4.75	2 400	3 700	52307	54307	54307U		68	37	52	72	27	28.6	31	21	56	10	7.5	35	52	1	0.3	0.710	0.898
	78	49	54	59	1	0.6	86.6	135	6.05	2 100	3 300	52308	54308	54308U		78	42	60	82	30.5	33	35.5	23.5	64	12	8.5	40	60	1	0.6	1.06	1.34
	90	65	69.4	77	1.1	0.6	141	205	9.25	1 700	2 600	52408	54408	54408U		90	42	65	95	40	42.2	46	22	72	15	12	40	65	1	0.6	2.03	2.55
35	73	37	39.6	45	1	0.6	59.7	105	4.75	2 600	4 000	52209	54209	54209U		73	47	60	78	23	24.3	27	23	56	9	7.5	45	60	1	0.6	0.620	0.784
	85	52	56.2	62	1	0.6	100	163	7.40	1 900	3 000	52309	54309	54309U		85	47	65	90	32	34.1	37	21	64	12	10	45	65	1	0.6	1.29	1.62
	100	72	78.8	86	1.1	0.6	162	242	10.9	1 500	2 300	52409	54409	54409U		100	47	72	105	44.5	47.9	51.5	23.5	80	17	12.5	45	72	1	0.6	2.91	3.42
40	78	39	42	47	1	0.6	60.6	111	5.05	2 300	3 600	52210	54210	54210U		78	52	62	82	24	25.5	28	30.5	64	9	7.5	50	62	1	0.6	0.710	0.890
	95	58	64.6	70	1.1	0.6	121	186	9.10	1 800	2 700	52310	54310	54310U		95	52	72	100	36	39.3	42	23	72	14	11	50	72	1	0.6	1.86	2.35
	110	78	83.2	92	1.5	0.6	185	283	12.8	1 400	2 100	52410	54410	54410U		110	52	80	115	48	50.6	55	30	90	18	14	50	80	1.5	0.6	3.56	4.39
45	90	45	49.6	55	1	0.6	86.7	159	7.20	2 100	3 200	52211	54211	54211U		90	57	72	95	27.5	29.8	32.5	32.5	72	10	9	55	72	1	0.6	1.12	1.44
	105	64	72.6	78	1.1	0.6	149	246	11.1	1 600	2 400	52311	54311	54311U		105	57	80	110	39.5	43.8	46.5	25.5	80	15	11.5	55	80	1	0.6	2.51	3.21
	120	87	92	101	1.5	0.6	223	359	16.2	1 200	1 900	52411	54411	54411U		120	57	88	125	53.5	56	60.5	22.5	90	20	15.5	55	88	1.5	0.6	4.70	5.62
50	95	46	50	56	1	0.6	92.0	179	8.05	1 900	3 000	52212	54212	54212U		95	62	78	100	28	30	33	30.5	72	10	9	60	78	1	0.6	1.25	1.57
	110	64	70.6	78	1.1	0.6	154	267	12.1	1 500	2 300	52312	54312	54312U		110	62	85	115	39.5	42.8	46.5	36.5	90	15	11.5	60	85	1	0.6	2.68	3.37
	130	93	99	107	1.5	0.6	267	397	19.7	1 100	1 700	52412	54412	54412U		130	62	95	135	57	60	64	28	100	21	16	60	95	1.5	0.6	6.33	7.60

[Remark] Standard cage types used for the above bearings are described earlier in this section.

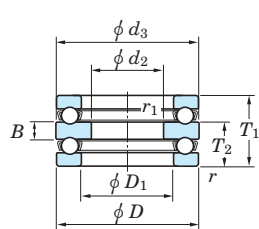
Figure 10-10 illustrates three different shaft-hub fit configurations:

- With flat back faces:** Shows a shaft with a flat back face and a hub with a flat back face. Dimensions include ϕd_3 , ϕd_2 , ϕD_1 , ϕD , r_1 , T_1 , T_2 , T_3 , T_4 , r , and B .
- With spherical back faces:** Shows a shaft with a spherical back face and a hub with a spherical back face. Dimensions include ϕd_3 , ϕd_2 , ϕD_1 , ϕD , r_1 , T_3 , T_4 , r , and B .
- With aligning seat races:** Shows a shaft with an aligning seat race and a hub with an aligning seat race. Dimensions include ϕd_a , ϕD_a , r_b , r_a , and C .

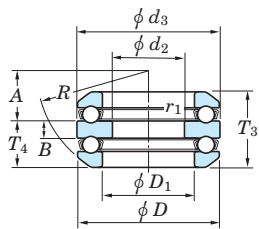
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Double direction thrust ball bearings

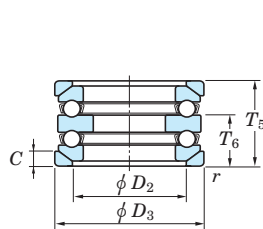
d_2 100 ~ 190 mm



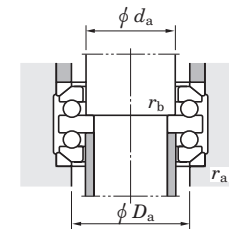
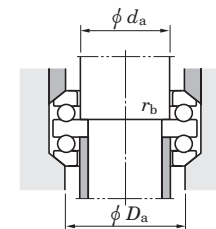
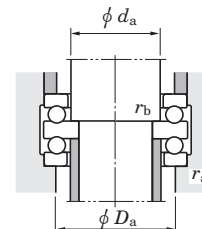
With flat back faces



With spherical back faces



With aligning seat races



Boundary dimensions (mm)							Basic load ratings (kN)		Fatigue load limit	Limiting speeds (min ⁻¹)		Bearing No.				Dimensions (mm)										Mounting dimensions (mm)				(Refer.) Mass (kg)		
<i>d</i> ₂	<i>D</i>	<i>T</i> ₁	<i>T</i> ₃	<i>T</i> ₅	<i>r</i> min.	<i>r</i> ₁ min.	<i>C</i> _a	<i>C</i> _{0a}	(kN) <i>C</i> _u	Grease lub.	Oil lub.	With flat back faces	With spherical back faces	With aligning seat races		<i>d</i> ₃ max.	<i>D</i> ₁ min.	<i>D</i> ₂	<i>D</i> ₃	<i>T</i> ₂	<i>T</i> ₄	<i>T</i> ₆	<i>A</i>	<i>R</i>	<i>B</i>	<i>C</i>	<i>d</i> _a min.	<i>D</i> _a max.	<i>r</i> _a max.	<i>r</i> _b max.	With flat back faces	With aligning seat races
100	170	68	71.6	82	1.1	1.1	192	472	17.7	1 100	1 700	52224	54224	54224U		170	123	145	175	41.5	43.3	48.5	58.5	125	15	15	120	145	1	1	5.24	6.44
	210	123	131.2	143	2.1	1.1	389	931	30.5	710	1 100	52324	54324	54324U		209.5	123	165	220	75	79.1	85	58	160	27	22	120	165	2	1	17.2	22.9
	270	192	—	—	4	2	623	1 540	49.0	490	750	52426	—	—		269	134	—	—	117	—	—	—	—	42	—	130	200	3	2	56.5	—
110	190	80	85.8	96	1.5	1.1	254	622	22.2	970	1 500	52226	54226	54226U		189.5	133	160	195	49	51.9	57	63	140	18	17	130	160	1.5	1	7.72	9.29
	225	130	—	—	2.1	1.1	413	1 030	32.5	650	1 000	52326	—	—		224	134	—	—	80	—	—	—	—	30	—	130	177	2	1	22.1	—
	280	196	—	—	4	2	650	1 680	52.2	450	700	52428	—	—		279	144	—	—	120	—	—	—	—	44	—	140	206	3	2	60.6	—
120	200	81	86.2	99	1.5	1.1	234	669	19.6	940	1 450	52228	54228	54228U		199.5	143	170	210	49.5	52.1	58.5	83.5	160	18	17	140	170	1.5	1	8.31	10.5
	240	140	—	—	2.1	1.1	458	1 130	36.9	620	950	52328	—	—		239	144	—	—	85.5	—	—	—	—	31	—	140	190	2	1	27.8	—
	300	209	—	—	4	2	711	1 910	57.4	420	650	52430	—	—		299	154	—	—	127.5	—	—	—	—	46	—	150	225	3	2	73.9	—
130	215	89	95.6	109	1.5	1.1	266	768	21.8	840	1 300	52230	54230	54230U		214.5	153	180	225	54.5	57.8	64.5	74.5	160	20	20.5	150	180	1.5	1	10.6	13.6
	250	140	—	—	2.1	1.1	451	1 200	36.0	580	900	52330	—	—		249	154	—	—	85.5	—	—	—	—	31	—	150	200	2	1	29.2	—
	320	226	—	—	5	2	852	2 410	70.3	390	600	52432	—	—		319	164	—	—	138	—	—	—	—	50	—	160	240	4	2	90.3	—
135	340	236	—	—	5	2.1	943	2 730	77.2	360	550	52434	—	—		339	174	—	—	143	—	—	—	—	50	—	170	255	4	2	108	—
140	225	90	97.4	110	1.5	1.1	279	803	23.4	810	1 250	52232	54232	54232U		224.5	163	190	235	55	58.7	65	70	160	20	21	160	190	1.5	1	12.2	14.6
	270	153	—	—	3	1.1	512	1 570	41.3	550	850	52332	—	—		269	164	—	—	93	—	—	—	—	33	—	160	215	2.5	1	37.7	—
	360	245	—	—	5	3	928	2 730	75.1	320	500	52436	—	—		359	184	—	—	148.5	—	—	—	—	52	—	180	270	4	2.5	126	—
150	240	97	104.4	117	1.5	1.1	326	874	26.3	750	1 150	52234	54234	54234U		239.5	173	200	250	59	62.7	69	87	180	21	21.5	170	200	1.5	1	15.2	17.8
	250	98	102.4	118	1.5	2	332	986	26.9	710	1 100	52236	54236	54236U		249	183	210	260	59.5	61.7	69.5	108.5	200	21	21.5	180	210	1.5	2	15.9	19.6
	280	153	—	—	3	1.1	579	1 570	47.4	520	800	52334	—	—		279	174	—	—	93	—	—	—	—	33	—	170	220	2.5	1	39.6	—
	300	165	—	—	3	2	578	1 580	46.2	490	750	52336	—	—		299	184	—	—	101	—	—	—	—	37	—	180	240	2.5	2	50.9	—
160	270	109	116.4	131	2	2	385	1 010	31.4	650	1 000	52238	54238	54238U		269	194	220	280	66.5	70.2	77.5	93.5	200	24	23	190	230	2	2	21.6	25.2
	320	183	—	—	4	2	679	1 950	55.3	440	680	52338	—	—		319	195	—	—	111.5	—	—	—	—	40	—	190	255	3	2	64.9	—
170	280	109	115.6	133	2	2	392	1 110	32.2	620	950	52240	54240	54240U		279	204	240	290	66.5	69.8	78.5	120.5	225	24	23	200	240	2	2	22.7	27.3
	340	192	—	—	4	2	745	2 220	61.1	420	650	52340	—	—		339	205	—	—	117	—	—	—	—	42	—	200	270	3	2	77.8	—
190	300	110	115.2	134	2	2	428	1 310	36.6	580	900	52244	54244	54244U		299	224	260	310	67	69.6	79	114	225	24	25	220	260	2	2	23.9	29.5

[Remark] Standard cage types used for the above bearings are described earlier in this section.